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Tire$aver™

Parker

USER MANUAL
Mobile TireSaver

Parker Hannifin Corporation
Filtration and Separation Division
242 Neck Road, P.O. Box 8223
Haverhill, MA 01835-0723
U.S.A.
Tel: 800-343-4048 Fax: 978-858-0505
www.parkertiresaver.com
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ISO 9001 Quality System Certified
Parker BALSTON

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1. Introduction

1.1 General

The *Mobile TireSaver* is a product of Parker Hannifin Corporation. This manual is an integral part of the product. The manual describes the daily operation, maintenance required and troubleshooting techniques, if necessary.

Content
Read the manual carefully before you start with the *Mobile TireSaver*. Familiarize yourself with the content.

Condition of change
Only execute changes to the *Mobile TireSaver* after explicit prior written permission by Parker Hannifin. Non-conformance to this rule, as well as any consequential damage, loss and costs are the responsibility of the owner and the user.

Information
All information in this manual, including additional drawings and technical descriptions, remains the property of Parker Hannifin Corporation and may not be used (other than for the use of this product), copied, multiplied or published to or for a third party without explicit prior written permission by Parker Hannifin Corporation.

1.2 Pictograms in this manual

In this manual the following pictograms are used:

Warning
A warning shows a hazard that can cause death or serious injury. Follow the instructions.

Caution
A caution shows a danger that can cause damage to the equipment. Follow the instructions.

Warning
Risk of death due to suffocation.

Risk of fire
Oxygen-enriched air leads to an increased risk of fire in the event of contact with inflammable products.

High pressure risk
Follow the instructions with respect to compressed gasses.

Instructions with respect to the environment.

1.3 Identification and service

The identification plate is located on the left side of the *Mobile TireSaver* and shows its characteristics.

For service and technical assistance, please contact:

Parker Hannifin Corporation
Filtration and Separation Division
242 Neck Road, P.O. Box 8223
Haverhill, MA 01835-0723 USA
Tel 800-343-4048
Fax: 978-858-0625
www.parker.com/tiresaver

1.4 Use in accordance with purpose

The *Mobile TireSaver* nitrogen generator is intended to make nitrogen out of normal, compressed air. The system is based on gas separation membrane technology. Each different or further use will not be in conformity with this purpose. Parker will not accept any liability for improper use. The *Mobile TireSaver* nitrogen generator is in compliance with the prevailing directives and standards. Only use this *Mobile TireSaver* in a technically perfect condition, in conformity with the purpose as described above.

1.5 User instructions

Only properly trained personnel are allowed to work on the *Mobile TireSaver* nitrogen generator. The user must be aware of hazards related to operating the *Mobile TireSaver* and processes connected to it. The user is responsible for the safety of personnel nearby. All personnel working on the *Mobile TireSaver* must have free access to the applicable manuals.

1.6 Liability

Parker Hannifin Corporation will not accept any liability if (but not limited to):

- The instructions in this manual are ignored.
- Replacement parts are used which are not approved by the manufacturer.
- The system is operated incorrectly and not within recommended specifications.
- The system is fed with gasses other than air.
- The system is modified without notification and authorization of the manufacturer.
- Maintenance and repair are not carried out according to the instructions.

2 Health, safety and environmental aspects

2.1 General

Correct use of the *Mobile TireSaver* nitrogen generator is important for your personal safety and for trouble-free operation. Incorrect use can cause damage to the *Mobile TireSaver* or can lead to incorrect gas supply to the customer's process.

Warning

- **Read this manual before you start the installation and begin operation of the *Mobile TireSaver*. Prevent accidents and damage to the system.**
- **Contact your supplier if you detect a problem that you cannot solve with this manual.**
- **Use the *Mobile TireSaver* in accordance with its purpose. Refer to section 1.4.**
- **Only service engineers that are qualified to work on pneumatic equipment are allowed to do the installation, maintenance and repairs. Refer to section 1.5.**
- **Do not tamper or experiment with the equipment. Do not exceed the technical specifications for the *Mobile TireSaver*. Refer to section 4.1.**

2.2 Compressed air

Warning

- **Ensure that the feed air pressure can not exceed 175 psig.**
- **Ensure that the equipment and the attendant piping is connected correctly for the pressures required.**
- **Depressurize the *Mobile TireSaver* and the connected systems before you disconnec parts of the system. The sudden escape of compressed air can cause serious injury or damage. Refer to section 6.2.**

2.3 Nitrogen and oxygen

The TireSaver generates nitrogen as a product. Oxygen enriched air is released as waste.

Warning

- **Nitrogen can cause suffocation!**
- **Oxygen-enriched air leads to increased risk of fire in the event of contact with flammable products. Make sure that there is adequate ventilation at all times!**
- **Do not install the *Mobile TireSaver* in an area where explosive substances may be present.**

2.4 Safety precautions

Warning

- **Ensure there is sufficient ventilation.**
- **Only feed the *Mobile TireSaver* with air.**
- **Maintain the air feed to the *Mobile TireSaver* clean and free of vapors of organic solvents and other contaminants.**
- **Keep the ambient temperature between -30 and 110°F (up to 120°F for short periods of time). Ensure the heat exchanger attached to the *Mobile TireSaver* is functioning properly when the system is running.**
- **Install the peripheral equipment and piping according to all applicable local regulations. Parker Hannifin Corporation is not responsible for customer installed piping.**
- **Regular maintenance should be performed on the *Mobile TireSaver* to ensure proper and safe operation. Refer to chapter 7.**
- **Ensure that instructions concerning health and safety are compliant with local regulations.**

2.5 Environmental aspects

The use and maintenance of the *Mobile TireSaver* do not include environmental dangers. Most parts are made of metal and can be disposed of in a manner consistent with local regulations.

- **Make sure that instructions concerning health, safety and environment are compliant with all local regulations.**

3 Description of the Mobile System

3.1 General

The *Mobile TireSaver* separates compressed air into nitrogen and an oxygen enriched air stream. The separation system is based on membrane technology. The compressed air is derived from a shared or dedicated compressor source.

The nitrogen produced is usually dispensed directly from the *Mobile TireSaver* unit to the tire or may be stored in a nitrogen storage vessel.

3.2 Separation principle

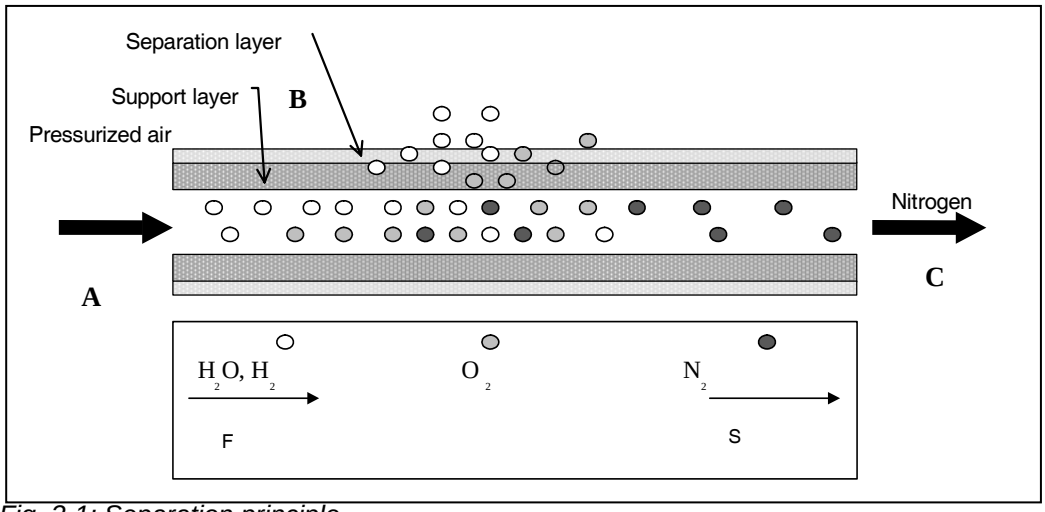


Fig. 3-1: Separation principle

A	Pressurized air inlet	F	Fast
B	Hollow fiber membrane	S	Slow
C	Nitrogen outlet		

Ambient air contains nitrogen (78.1%), oxygen (20.9%), argon (1%), carbon dioxide, water vapor and traces of other inert gasses. Pressurized air (A) is fed through the hollow fiber membrane (B). The various air components diffuse through the wall of the membrane.

The diffusion rate differs for the various gasses:

- Oxygen and water vapor have a high diffusion rate and permeate rapidly through the membrane wall.
- Nitrogen has a low diffusion rate and permeates slowly through the membrane wall.

At the exit of the membrane (C), pressurized nitrogen is released.

3.3 Process parameters

The nitrogen production depends on these parameters:

Flow rate

The lower the flow rate of compressed air through the hollow fiber membrane, the more oxygen can permeate through the membrane wall. As a result, the nitrogen produced at the outlet will have a higher purity. Nitrogen purity can be adjusted with the flow control valve. **This valve is factory preset; do NOT adjust without consulting the factory first.**

Temperature

The *Mobile TireSaver* operates optimally at a temperature between 70-80°F. If the temperature increases, the pressurized air consumption will also increase. The system contains an integral heat exchanger to allow the gas to cool before it enters the membrane.

Membrane pressure

A higher membrane pressure will increase the capacity (i.e. nitrogen output) of the *Mobile TireSaver*. **Do not exceed 175 PSIG. For ambient temperatures between 110°F and 120°F do not exceed 150 psig.** Tire fill times are directly related to inlet pressure. Fill times listed in literature are nominal, and assume full inlet pressure (150 psig), minimal pressure drop through customer supplied fittings and adaptors from install, as well as clean filters. **Product will not work properly with an inlet pressure of less than 145 psig.** Lower pressures will result in longer fill times so it is important to maintain the system and the attendant compressor system. Also note any fill times listed here or elsewhere are fill times only; they do not include the time it may take to drain a tire or to perform multiple flushes.

External pressure

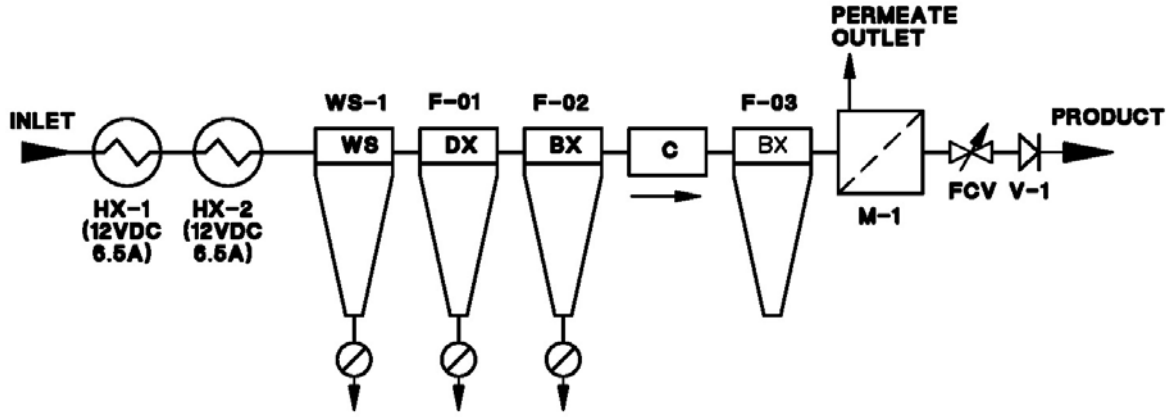
There must be atmospheric pressure at the vent or permeate outlet. The capacity and the purity of the nitrogen gas decreases strongly if the vent or permeate pressure exceeds atmospheric pressure. Do not block off or restrict the flow output of the permeate outlet.

Compressed Air Quality

Poor air quality (ie…oil, solvents, etc.) will affect performance and may permanently damage the nitrogen membrane. Please see Section 4.1 for specifications.

3.4 Process Schemes

Model MTS06 & MTS12



HX-1	HEAT EXCHANGER	
HX-2	HEAT EXCHANGER	-MTS12 ONLY
WS-1	WATER SEPARATOR	
F-01,F-02,F-03	COALESCING FILTER	
C	ACTIVATED CARBON BED	
M-1	GAS SEPARATION MEMBRANE	
FCV	FLOW CONTROL VALVE	
V-1	NON-RETURN VALVE	

Fig. 3-4: Process Schematic

4 Technical specifications

4.1 General

Delivery pressure	MTS06	MTS12
Maximum delivery pressure	Inlet minus 10 psig	Inlet minus 20 psig
Compressed air requirements		
Maximum feed pressure	175 psig	175 psig
Minimum feed pressure (2)	145 psig	145 psig
Compressed air temperature range	40 to 250 °F	
Residual oil content	$\leq$ 0.01 mg/m^3	
Pressure dew point	< 40 °F	
Air Consumption	18 SCFM	35 SCFM
Electrical Requirements		
Voltage	12VDC	
Current	6.5A	13A
Fuse Recommendation	15A	
Ambient Conditions		
Temperature (min/max)	-30 to 110°F	
High Temp. Climates (max) (1)	-30 to 120°F @ 150 PSIG	
Dimensions and connections		
Dimensions	42.5”x28.7”x11.5”	42.5”x36.8”x11.5”
Net Weight	200 lbs	220 lbs
Connections		
Inlet	½“ NPT Female	
Outlet	½“ NPT Female	
Electrical	10” Wire leads	
Output		
Capacity at 68°F and 1 atm	6 SCFM	12 SCFM
Purity at specified capacity	95% N_2 by Volume	

Table 4-1: General data

(1) For temperatures 110°F-120°F, regulate inlet pressure to 150 psig, with pressure regulator (½“ NPT). Use intermittently in this temperature range.

(2) Product will not operate properly with an inlet pressure of less than 145 psig.

4.2 Maintenance Kit

Part	P/N
• MTS06 & MTS12 Maintenance Kit	MKMTS

5. Installation

Follow the sections in this chapter to install the *Mobile TireSaver*.

5.1 Transport

Warning

- **Put the *Mobile TireSaver* in the original packaging to transport it over longer distances.**
- **For qualifications of installation personnel, refer to section 2.1.**

5.2 Define location

1. Determine the location where the *Mobile TireSaver* is to be installed. Typical locations include inside a box truck or on the bed of a stake truck or pickup. Ensure the following:
   a. Location is such that the system can be securely attached to prevent flying hazards in case of accident. **Note weight and size of unit when determining mounting location. See Table 4.1 and Figure 5.1**
   b. Proper ventilation is provided for both the heat exchanger and the oxygen enriched waste stream.
   c. There is easy access to front and side of unit for routine maintenance and service.
   d. Routing of inlet and outlet hose and electrical connections are convenient.
   e. It must be mounted such that the unit stands upright (see Figure 5.1).
2. Perform the complete installation procedure again if you move the *Mobile TireSaver* to a new location.

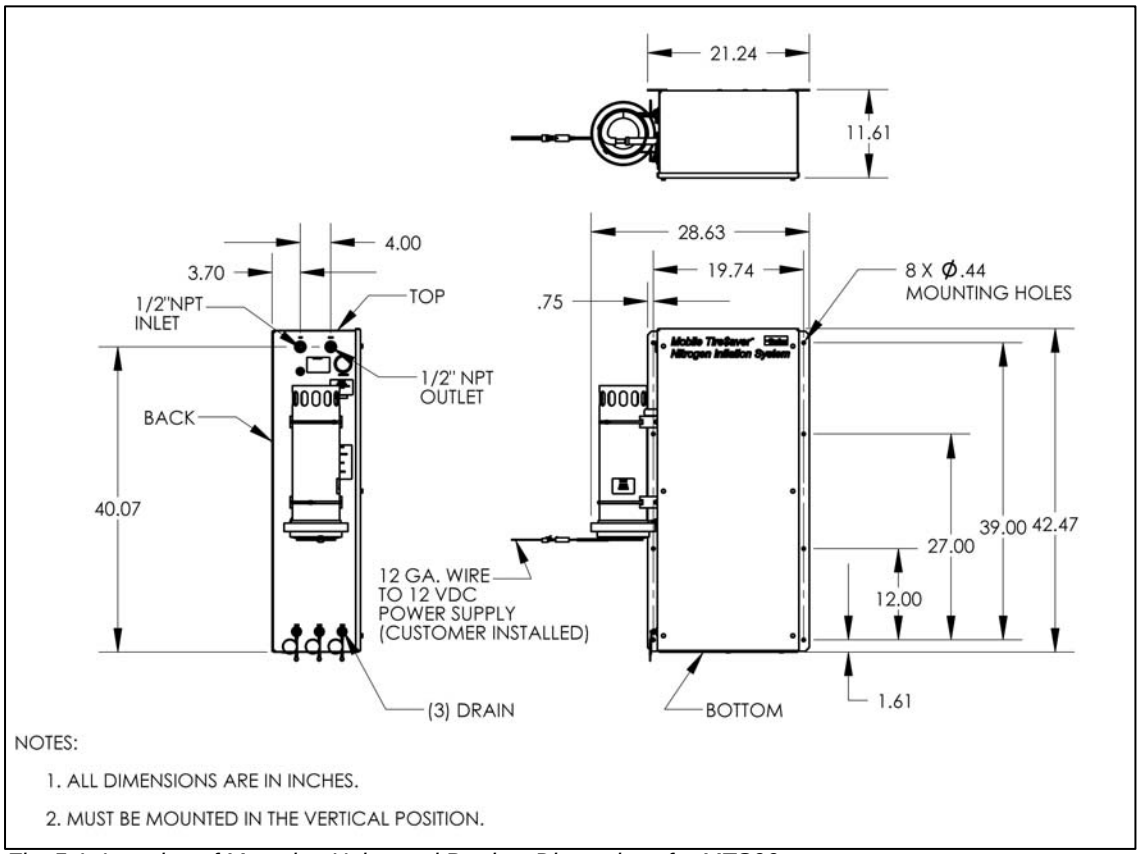


Fig. 5-1: Location of Mounting Holes and Product Dimensions for MTS06

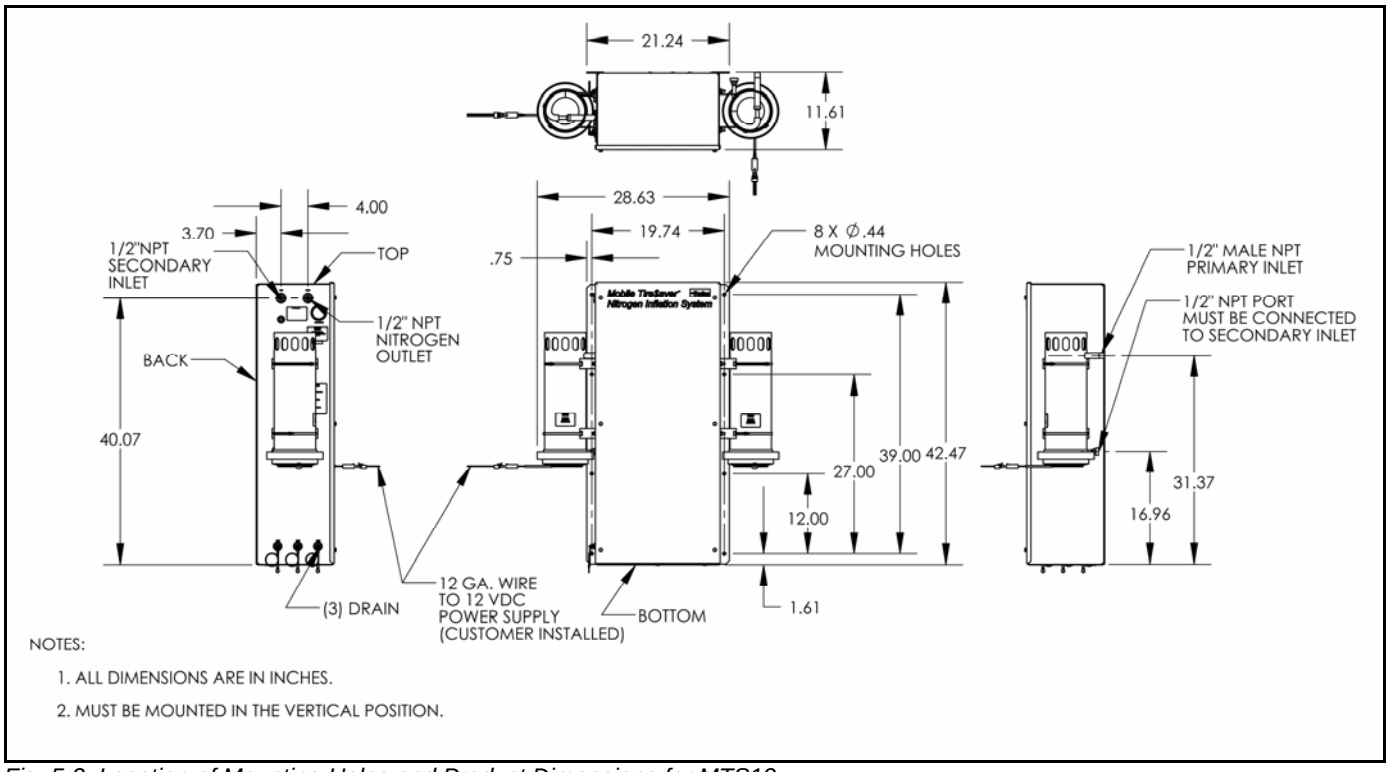


Fig. 5-2: Location of Mounting Holes and Product Dimensions for MTS12

5.3 Unpack and check equipment (refer to section 5.3.1)

1. Open the packaging.
2. Ensure that all components are delivered.
3. Ensure that the available compressed air meets specification:
   - Oil content of the compressed air is below 0.01mg/m^3.
   - Ensure that the compressed air pressure and quality is always as prescribed. The capacity must be sufficient. A gasoline powered compressor typically produces about 2 SCFM per horsepower at 175psig discharge pressure. Therefore, for a duty cycle of 100% an MTS06 system needs a minimum of 9 HP. More power is recommended to allow the compressor to have a proper duty cycle as recommended by the compressor manufacturer. The MTS12 will require a 18 HP compressor at a minimum.
   - [Optional] If installed, ensure that the pressurized air dryer is of proper size and that it is in working order.

5.3.1 Parts Checklist

Items included in the package:

1. *Mobile TireSaver* Nitrogen Generator.
2. Installation and operation manual.

5.3.2 Aftercooler Fitting Installation Instructions

The secondary AfterCooler mounted on the right side of the Mobile Tire Saver has two connection points. The inlet port is a ½" MNPT stainless steel pipe and the outlet port is a ½" FNPT copper fitting welded to copper pipe.

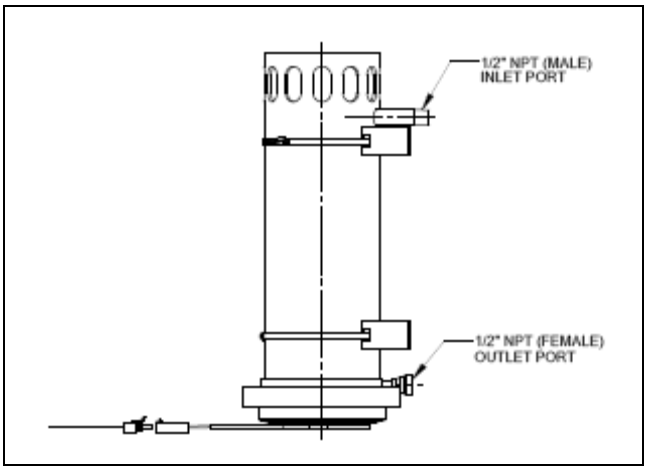


Fig. 5-3: Installation of AfterCooler Fittings

Installing your fitting to the inlet port:

1. Follow normal pipe fitting practices.
2. Use Teflon tape, pipe dope or other suitable sealant/lubricant on the ½" MNPT pipe nipple to prevent damage to the threads and allow for a tighter joint.
3. Install your fitting hand tight. Use of excess force will cause the pipe nipple to rotate and in turn the cooper tube to rotate and kink.
4. Using a pipe wrench to hold the 1/2" stainless steel pipe nipple install your fitting per the manufacturers instructions.
5. Never turn the ½" stainless steel nipple, as its rotation may cause damage to the copper tube of the AfterCooler.

Installing your fitting to the outlet port:

1. Follow normal pipe fitting practices.
2. Use Teflon tape, pipe dope or other suitable sealant/lubricant on your ½" MNPT fitting.
3. Install your fitting hand tight so it is snug but not too tight. Making sure the threads are aligned properly so as not to strip the copper thread. Use of excess force will cause the cooper tube to rotate and kink.
4. Use a pipe wrench to hold the 1/2" copper fitting around the Hex only. Using tools other than a pipe wrench may result in the tool slipping off of or stripping the hex. If this occurs the further rotation of your fitting will cause the copper tube to rotate and kink.
5. Never turn the copper hex fitting, as its rotation may cause damage to the copper tube of the AfterCooler.

5.3.3 Items required by customer for proper installation, Model MTS06

1. Suitable means to attach process air from vehicle air compressor system to the inlet of the *Mobile TireSaver*. The inlet connection is ½" FNPT (see section 4.1). Note that the inlet temperature of the compressed air coming from the compressor can be over 200°F therefore it is recommended that high temperature hose be used.
2. Suitable connection from system outlet to customer's tire filling hoses or manifold. The exit connection is ½" FNPT.
3. PTFE pipe seal tape or other suitable thread sealant for the NPT thread connections.
4. Suitable connectors for mounting of system. 3/8" mounting holes are available on both sides of system (refer to Figure 5.1). In addition, one or more bolts through the base of the unit are recommended. Either new holes can be drilled in the base (being careful not to damage any system components) or some of the drain holes can be utilized for mounting the bolts. Note orientation of unit: it must be installed vertically.
5. Choose an installation method. A typical service truck compressed air system is as follows:

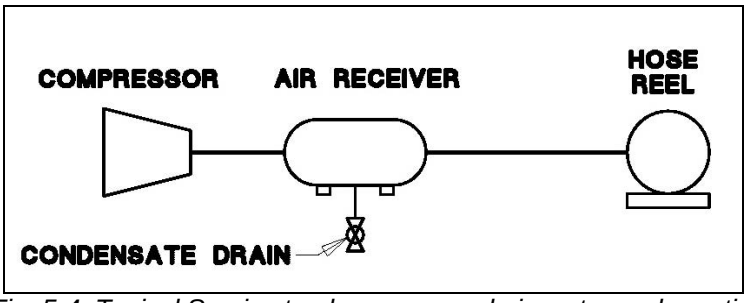


Fig. 5-4: Typical Service truck compressed air system schematic

On a typical service truck, a compressor would feed an air receiver which is on a pressure switch or relief valve. When the upper pressure limit is reached, either the pressure switch will idle the compressor or the relief valve will dump excess pressure from the air system. When demand exists the pressure in the receiver will fall, and the compressor will start to generate again or the relief valve will close allowing pressure to build.

As hot air from the compressor travels down the air line it will cool down. Water condensate will form in the air line if the compressed air temperature drops lower than the dew point of the compressed air. Therefore, a drain valve is recommended at the bottom of the air receiver. Please check valve operation as part of routine maintenance to ensure debris is not blocking the drain opening.

One method of installing the *Mobile TireSaver* is to utilize the existing hose reel(s) by placing three ball valves into the line as follows:

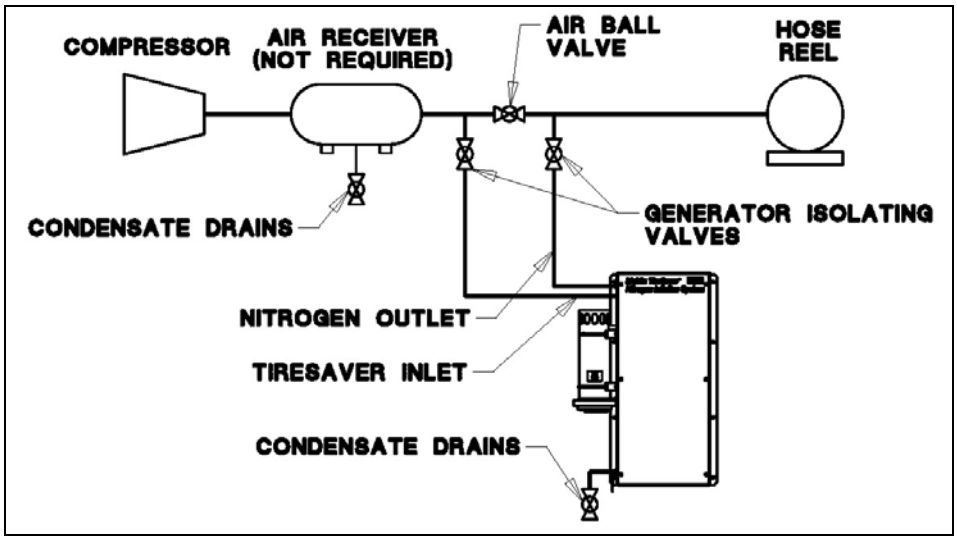


Fig. 5-5: Three Valve Product Installation

If installed in this manner, the *Mobile TireSaver* can be turned on and off by the isolating valves as shown. The benefits of this approach are that the existing hose reel system is utilized for both air and nitrogen. Operation is as follows: when air is required, close the generator isolating valves and open the air ball valve. When nitrogen is required, close the air ball valve and open the isolating valves to the generator. This will force all of the air to the generator and put nitrogen back into the main line for the hose reels. It is not recommended to open up both the air ball valve and the generator isolating valves; results would be unpredictable and potentially damaging to the generator.

Another option for installing the *Mobile TireSaver* is to use separate hose reels for both air and nitrogen:

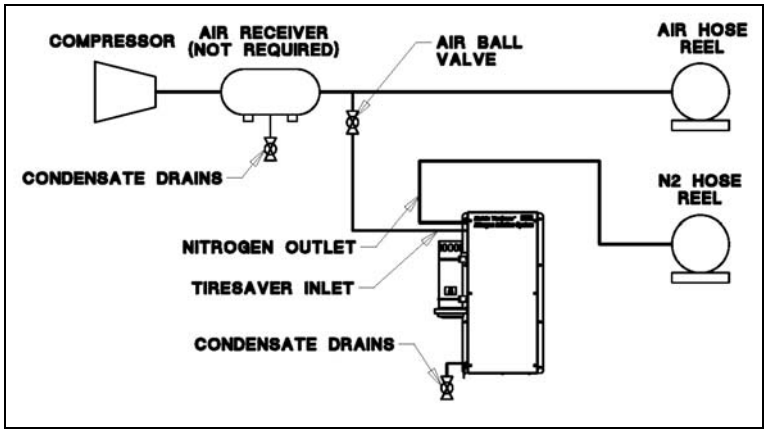


Fig. 5-6: Single Valve Product Installation

This approach only utilizes one ball valve to isolate the generator. However, to maintain correct feed pressure to the *Mobile TireSaver* do not run both the air and the nitrogen hose reels at the same time.

No matter how the generator is installed, it is recommended that the inlet to the *Mobile TireSaver* be closed when nitrogen is not needed. The membrane system will constantly bleed off the oxygen enriched waste stream if it is pressurized even if there is no nitrogen demand from the system.

6. The *Mobile TireSaver* requires cool gas feeding the membrane system therefore it is equipped with a heat exchanger driven by a 12VDC electric fan. The fan connection is a pair of wire leads which must be attached to the service truck electrical system. **It is advised that due to the potential danger of distributing electric to this or any other system the electrical installation should be completed by a licensed professional.** There are three suggested means of hooking up the electrical system:

a. Hook into the ignition of the vehicle so that when the ignition is on, the fan will run. This requires that when the system is in use that the ignition be on or that the truck be running to conserve battery life.

b. If the compressor has an electrically controlled pressure switch then the cooling fan for the system may be tied into it. When the pressure switch is activated the compressor will run, and in turn, the fan will be on.

c. A switch may be wired to the fan such that if the compressor is on, the fan will be energized. Alternatively, a manual switch can be employed but it is very important that the operators turn the switch on when in use.

7. The fan is sealed for weather resistance. However, if snow and ice accumulates such that the fan blade cannot spin, the motor will lock causing a large current draw. If the system is not fused properly, this condition will be a fire hazard. Even if it is fused properly, the fuse should blow in this instance. If the motor appears to be in a condition in which it may not spin freely, let it warm up for a few minutes either by pulling the truck inside to warm up or allowing the system to operate with the fan off. A quick disconnect is provided for this purpose. The hot compressor gas will heat the heat exchanger tube and fins, thus melting any snow or ice present.

8. The electrical connection must be fused as close to the power source as possible. The Blue wire is +12VDC, black is -12VDC from the fan; the wire leads are: red is +12VDC, black is -12VDC. The recommended fuse size is 15 Amps.

5.3.4 Items required by customer for proper installation, Model MTS12

1. Suitable means to attach process air from vehicle air compressor system to the inlet of the *Mobile TireSaver*. The inlet connection is ½" FNPT; it is the top connector on the right heat exchanger (when looking at uint from the fornt). See Figure 5.6. It will be necessary to connect hose from the outlet of the right heat exchanger to the inlet of the *Mobile TireSaver* on the left side top of the cabinet Route this hose in a manner convenient for the particular installation chosen.
   Note that the inlet temperature of the compressed air coming from the compressor can be over 200°F therefore it is recommended that high temperature hose be used.

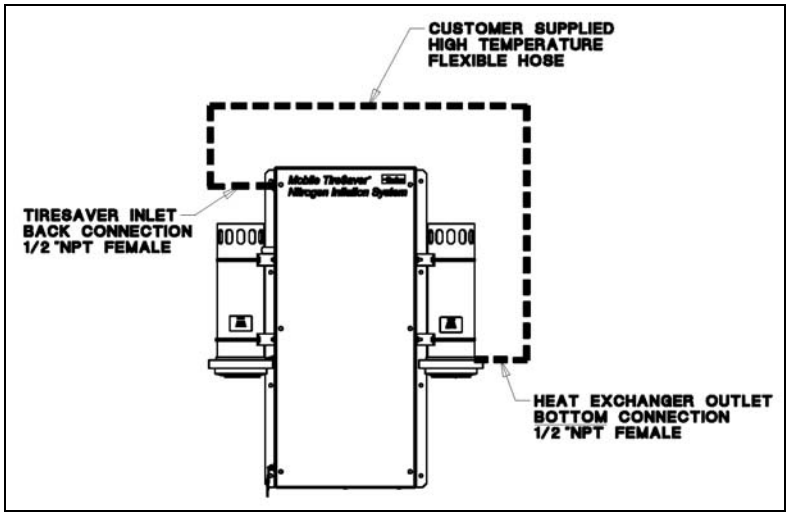


Fig. 5-7: MTS12 Inlet Connection

2. Suitable connection from system outlet to customer's tire filling hoses or manifold. The exit connection is ½" FNPT.
3. PTFE pipe seal tape or other suitable thread sealant for the NPT thread connections.
4. Suitable connectors for mounting of system. 3/8" mounting holes are available on both sides of system (refer to Figure 5.2). In addition, one or more bolts through the base of the unit are recommended. Either new holes can be drilled in the base (being careful not to damage any system components) or some of the drain holes can be utilized for mounting the bolts. Note orientation of unit: it must be installed vertically.
5. Choose an installation method. A typical service truck compressed air system is described in Figure 5-4.

One method of installing the *Mobile TireSaver* is to utilize the existing hose reel(s) by placing three ball valves into the line as follows:

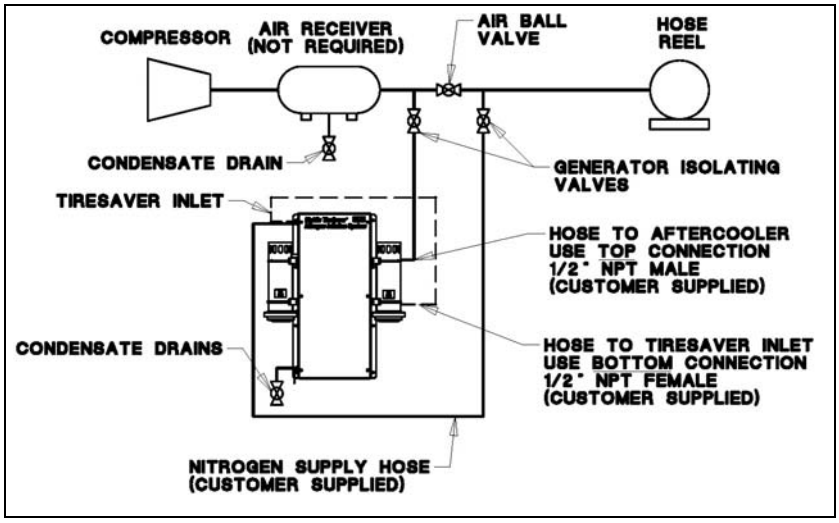

COMPRESSOR
AIR RECEIVER (NOT REQUIRED)
AIR BALL VALVE
HOSE REEL
CONDENSATE DRAIN
GENERATOR ISOLATING VALVES
TIRESAVER INLET
HOSE TO AFTERCOOLER USE TOP CONNECTION 1/2" NPT MALE (CUSTOMER SUPPLIED)
CONDENSATE DRAINS
HOSE TO TIRESAVER INLET USE BOTTOM CONNECTION 1/2" NPT FEMALE (CUSTOMER SUPPLIED)
NITROGEN SUPPLY HOSE (CUSTOMER SUPPLIED)

Fig. 5-8: MTS12 Three Valve Product Installation

If installed in this manner, the *Mobile TireSaver* can be turned on and off by the isolating valves as shown. The benefits of this approach are that the existing hose reel system is utilized for both air and nitrogen. Operation is as follows: when air is required, close the generator isolating valves and open the air ball valve. When nitrogen is required, close the air ball valve and open the isolating valves to the generator. This will force all of the air to the generator and put nitrogen back into the main line for the hose reels. It is not recommended to open up both the air ball valve and the generator isolating valves; results would be unpredictable and potentially damaging to the generator.

Another option for installing the *Mobile TireSaver* is to use separate hose reels for both air and nitrogen:

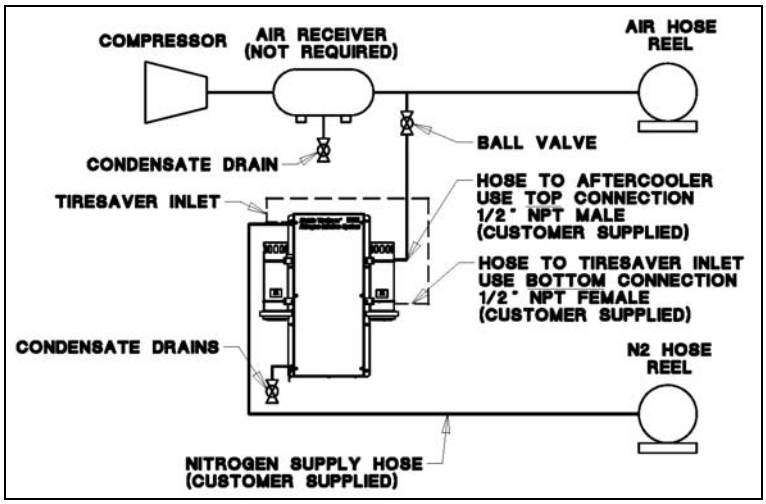

COMPRESSOR
AIR RECEIVER (NOT REQUIRED)
AIR HOSE REEL
BALL VALVE
CONDENSATE DRAIN
TIRESAVER INLET
HOSE TO AFTERCOOLER USE TOP CONNECTION 1/2" NPT MALE (CUSTOMER SUPPLIED)
HOSE TO TIRESAVER INLET USE BOTTOM CONNECTION 1/2" NPT FEMALE (CUSTOMER SUPPLIED)
CONDENSATE DRAINS
N2 HOSE REEL
NITROGEN SUPPLY HOSE (CUSTOMER SUPPLIED)

Fig. 5-9: MTS12 Single Valve Product Installation

This approach only utilizes one ball valve to isolate the generator. However, to maintain correct feed pressure to the *Mobile TireSaver* do not run both the air and the nitrogen hose reels at the same time.

No matter how the generator is installed, it is recommended that the inlet to the *Mobile TireSaver* be closed when nitrogen is not needed. The membrane system will constantly bleed off the oxygen enriched waste stream if it is pressurized even if there is no nitrogen demand from the system.

6. The *Mobile TireSaver* requires cool gas feeding the membrane system therefore it is equipped with two heat exchangers driven by two separate 12VDC electric fans. The fan connection is a pair of wire leads which must be attached to the service truck electrical system. **It is advised that due to the potential danger of distributing electric to this or any other system the electrical installation should be completed by a licensed professional.** There are three suggested means of hooking up the electrical system:
   a. Hook into the ignition of the vehicle so that when the ignition is on, the fan will run. This requires that when the system is in use that the ignition be on or that the truck be running to conserve battery life.
   b. If the compressor has an electrically controlled pressure switch then the cooling fan for the system may be tied into it. When the pressure switch is activated the compressor will run, and in turn, the fan will be on.
   c. A switch may be wired to the fan such that if the compressor is on, the fan will be energized. Alternatively, a manual switch can be employed but it is very important that the operators turn the switch on when in use.

7. The fans are sealed for weather resistance. However, if snow and ice accumulates such that the fan blade cannot spin, the motor will lock causing a large current draw. If the system is not fused properly, this condition will be a fire hazard. Even if it is fused properly, the fuse should blow in this instance. If the motor appears to be in a condition in which it may not spin freely, let it warm up for a few minutes either by pulling the truck inside to warm up or allowing the system to operate with the fan off. A quick disconnect is provided for this purpose. The hot compressor gas will heat the heat exchanger tube and fins, thus melting any snow or ice present.

8. The electrical connection must be fused as close to the power source as possible. The Blue wire is +12VDC, black is -12VDC from the fan; the wire leads are: red is +12VDC, black is -12VDC. The recommended fuse size is 15 Amps.

5.4 Connection to compressed air feed and nitrogen hose reel

Warning

- **Make sure that the inlet and outlet hose and pipe are free of dust, particles, metal parts and curls, liquids and grease before you connect the *Mobile TireSaver*.**

1. Connect the product outlet to the hose reel connection or other process connection using pipe sealant or PTFE tape for thread sealant.
2. Connect the compressed air supply to the compressed air inlet on the *Mobile TireSaver* using pipe sealant or PTFE tape for sealing connections.

5.5 Commissioning of a *Mobile TireSaver*

1. Ensure that the connections are correct and tightened.
2. Check filter bowls and separator bowls for proper positioning, ensuring no leaks due to vibration.
3. Open the compressed air supply slowly – **damage to membrane could occur if compressed air pressure is not introduced slowly.**
4. Ensure that the compressed air pressure comes up to full system output.
5. Ensure that the installation has no leaks which may have occurred due to transport.

6. The system is ready for use now.
7. Drain the condensate on a regular basis. It is recommended that this be done at least daily, if not more often. Additionally, it is recommended that it be done while the system is under pressure and at the end of the work day to prevent any condensate from freezing in cold climates. If no liquid is removed from drains in cold climates, the filter bowls may have frozen condensate. Park truck in warm area until condensate thaws. Check filter bowls and aftercooler fan area for ice, snow and water, as needed.

5.6 Adjusting the purity

The purity is factory pre-set at 95%, which means that there is 5% residual oxygen. The purity has been set by adjusting the flow control valve. Normally the setting is stable and does not need to be checked.

If it becomes necessary to adjust the purity, this can be done by adjusting the flow control valve until the purity, as measured with an oxygen analyzer taking a sample from the outlet, has the desired purity. As nitrogen purity is increased, output flow will be reduced.

6 Operation

6.1 Start-up and operation of *Mobile TireSaver*

1. Open the compressed air supply **very slowly** and any outlet valve, if installed.
2. The system will start to produce nitrogen as soon as the nitrogen outlet is opened. The specified purity will be available instantaneously.
3. **It is highly recommended that the bowls of the separator and the two prefilters be drained after filling eight truck tires or every hour of operation, whichever occurs first.**

6.2 Stop operation of *Mobile TireSaver*

1. Shut off the pressurized air supply before you perform maintenance.
2. Depressurize the system by venting: use the condensate drains or open the nitrogen outlet until all pressurized gas has vented.

TIP: should the filters not be fully depressurized it is possible to depressurize them manually by slowly unscrewing the bleed screw on the bottom of the filter bowl on one of the filters. Prior to reinstalling the bleed screw after venting, ensure the o-ring is seated properly. It may be necessary to vent the filters all the way down to atmospheric pressure so that the o-ring will seat.

6.3 Troubleshooting

Error	Possible cause	Possible solution
Delivery of nitrogen too low or absent	Compressed air supply too low	Check/increase the air supply.
	Ambient temperature is too high	Lower the temperature, if possible.
	Compressed air temperature is too high	Lower the temperature, if possible.
	Air filters are polluted	Change the air filters.
	Leak in piping	Check for leaks in piping; repair.
	Nitrogen outlet line is blocked	Check/open the outlet line.
	Blockage	Check the compressed air delivery from the compressor.
Air is constantly escaping from drain ports	Pull drain is broken	Replace pull drain.
	Pull drain is blocked	Open / close pull drain rapidly.
Fill times are longer than 5-10 minutes for a typical truck tire	Low inlet pressure	Verify inlet pressure. See gauge on system.
	Leaks in piping/hose	Check for leaks downstream from generator; correct.
	Generator flow is out of specification	Check with factory about setting.
	Membrane is damaged	Check with factory about replacement.

7 Maintenance

7.1 Maintenance requirements

Part	Action	Frequency
Filter	Replace filter element. Refer to section 7.2	2x per year, or when indicator on the filter head reaches the end of the indicator bar
Carbon Adsorber	Replace carbon. Refer to section 7.4	Together with the filter elements, 2x per year

Table 7-1: Maintenance scheme

7.2 Replace filter element

1. Turn off the air supply.
2. Let the system depressurize.
3. Unscrew the bleed screw (E) slowly to ensure that the filter is depressurized.
4. Turn the filter bowl (D) counter- clockwise and pull the bowl from the filter housing (A).
5. Unscrew the blue knob (C).
6. Remove the old filter element (B).
7. Install a new filter element (B).
8. Assemble the parts in the reverse order.
9. When replacing part PS802, a small amount of loctite is recommended on the threads of the water separator locking ring for the bowl as the bowl uses a threaded ring instead of a bayonet type connector, as described here.

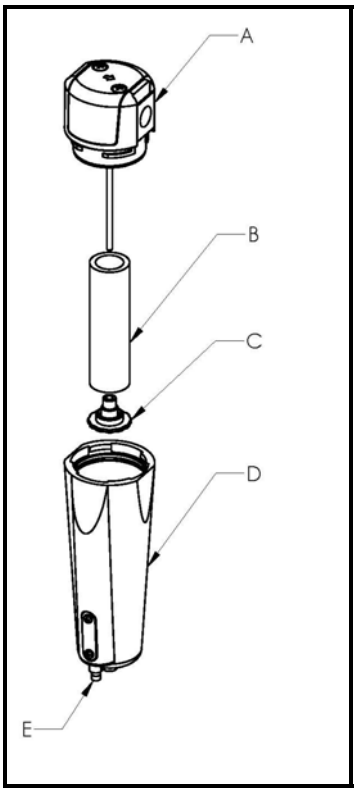


Fig. 7-2: Replace filter element

7.3 Clean automatic drain (if installed)

1. Open the filter by untwisting the bowl ¼ turn counter-clockwise.
2. Unscrew the nut (F).
3. Remove the drain unit (B-E) from the filter bowl (A).
4. Remove the O-ring (E).
5. Carefully pull the floating house (B) from the seat (D). Do not bend the needle (C).
6. Clean the parts with soap and water. Make sure that the needle bore is open and clean.
7. Assemble the parts in the opposite direction. Make sure that the parts are dry before reassembly.

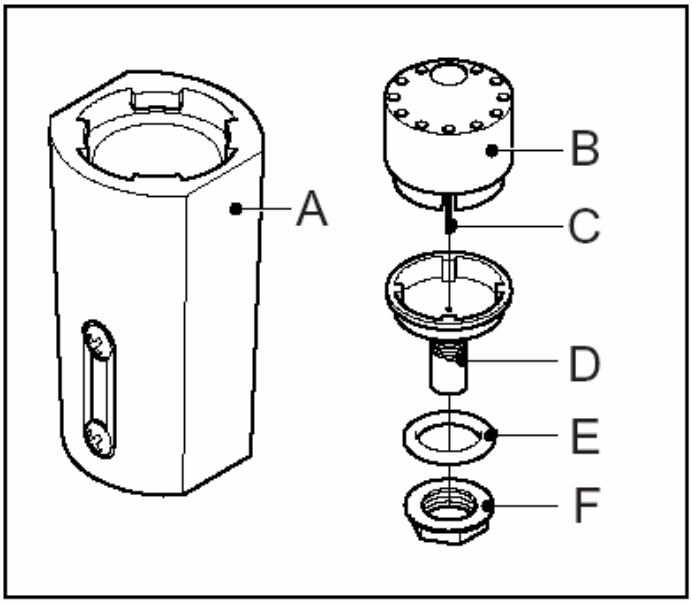


Fig. 7-3: Clean drain filter

7.4 Replace Carbon Adsorber

1. Loosen and remove hose connectors from 37° JIC hoses attached to each end of carbon tower.
2. Remove four ¼-20 screws on clamps holding carbon tower.
3. Carefully pull carbon tower out of cabinet.
4. Install replacement tower; it will have the JIC elbows pre-installed. If adjustment is needed on the JIC elbows, use a wrench to turn as needed. Be sure brackets are put into the correct place during re-assembly.
5. Screw carbon tower back into cabinet and reattach hoses. No pipe sealing tape or other compounds are needed for reattaching the hose connectors.

7.5 Spare Parts

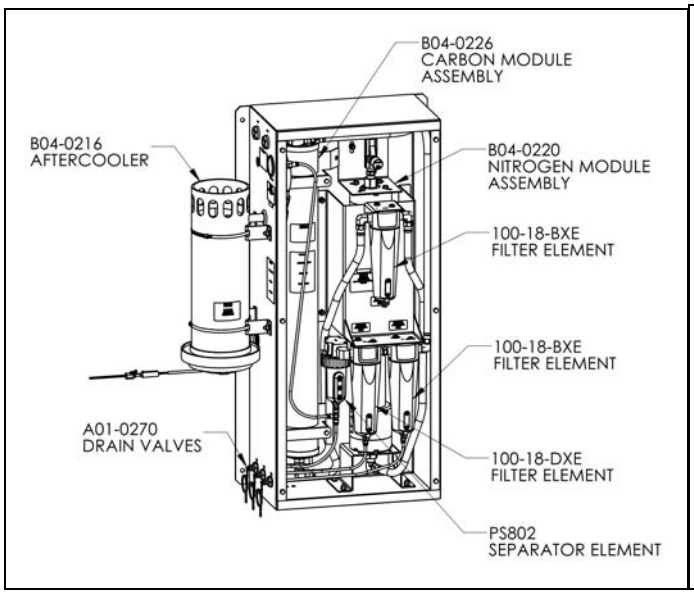


Fig. 7-4:
Replacement Parts/Maintenance Items – MTS06

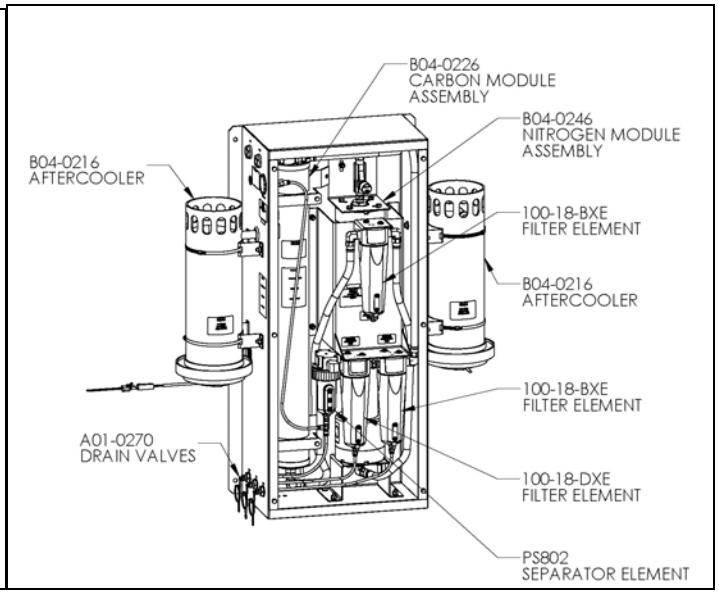


Fig. 7-5:
Replacement Parts/Maintenance Items – MTS12

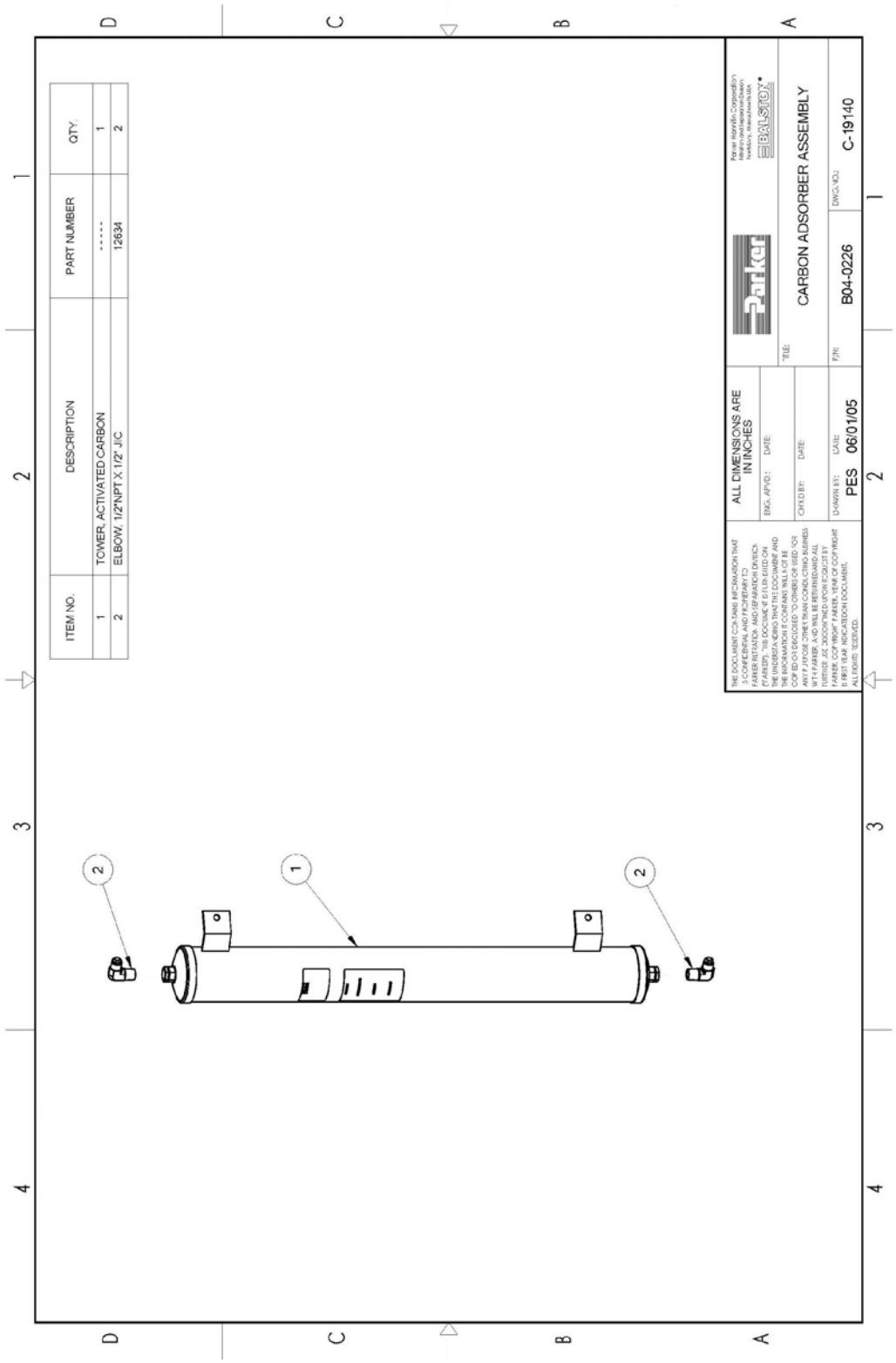
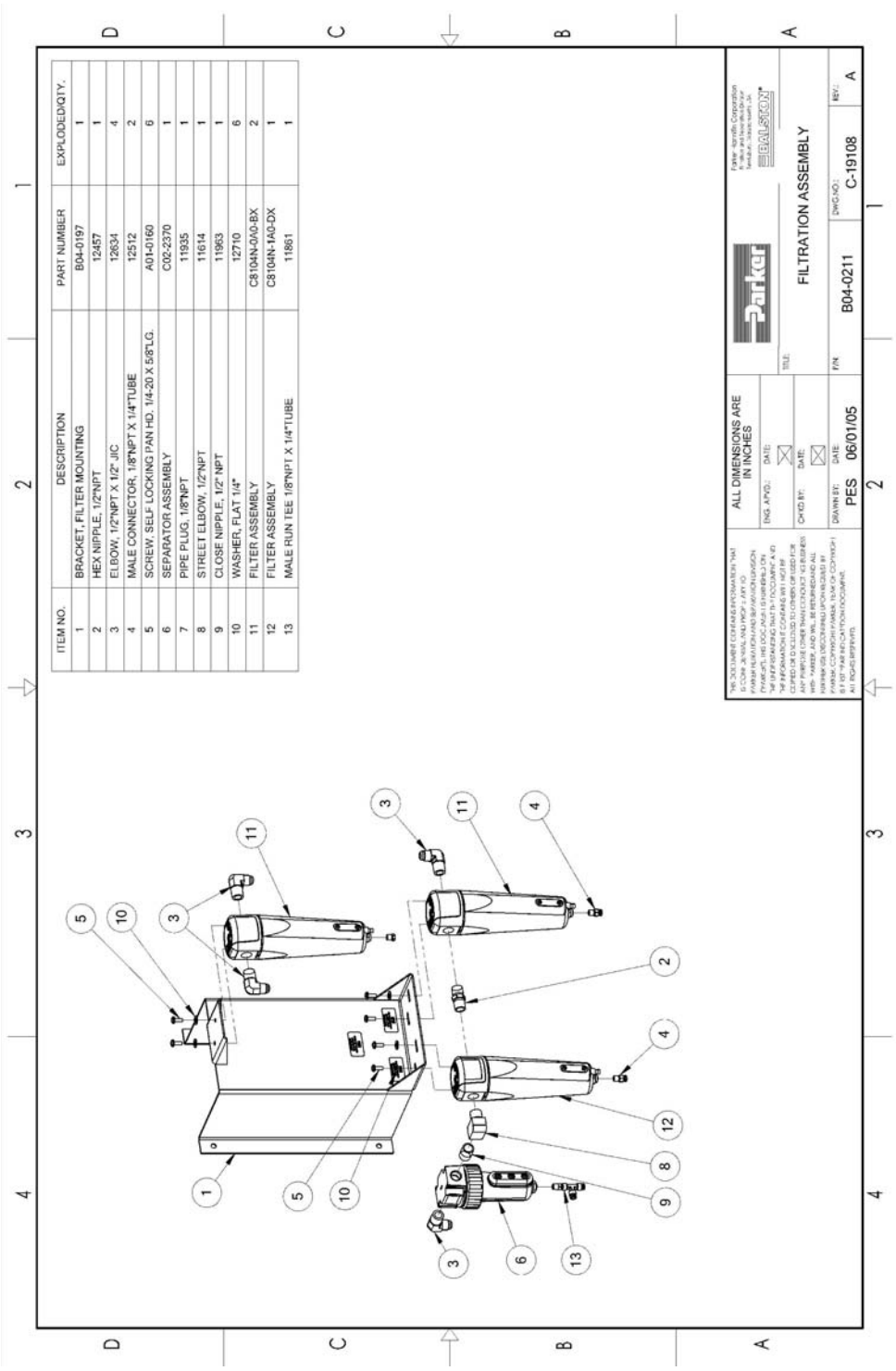


Fig. 7-6: Exploded View, Carbon Adsorber Assembly



ITEM NO.	DESCRIPTION	PART NUMBER	EXPLODED/QTY.
1	BRACKET, FILTER MOUNTING	B04-0197	1
2	HEX NIPPLE, 1/2"NPT	12457	1
3	ELBOW, 1/2"NPT X 1/2" JIC	12634	4
4	MALE CONNECTOR, 1/8"NPT X 1/4"TUBE	12512	2
5	SCREW, SELF LOCKING PAN HD. 1/4-20 X 5/8"LG.	A01-0160	6
6	SEPARATOR ASSEMBLY	C02-2370	1
7	PIPE PLUG, 1/8"NPT	11935	1
8	STREET ELBOW, 1/2"NPT	11614	1
9	CLOSE NIPPLE, 1/2" NPT	11963	1
10	WASHER, FLAT 1/4"	12710	6
11	FILTER ASSEMBLY	C8104N-0A0-BX	2
12	FILTER ASSEMBLY	C8104N-1A0-DX	1
13	MALE RUN TEE 1/8"NPT X 1/4"TUBE	11861	1

ALL DIMENSIONS ARE IN INCHES

ENG APVD: DATE:

CHKD BY: DATE:

DRAWN BY: PES DATE: 06/01/05

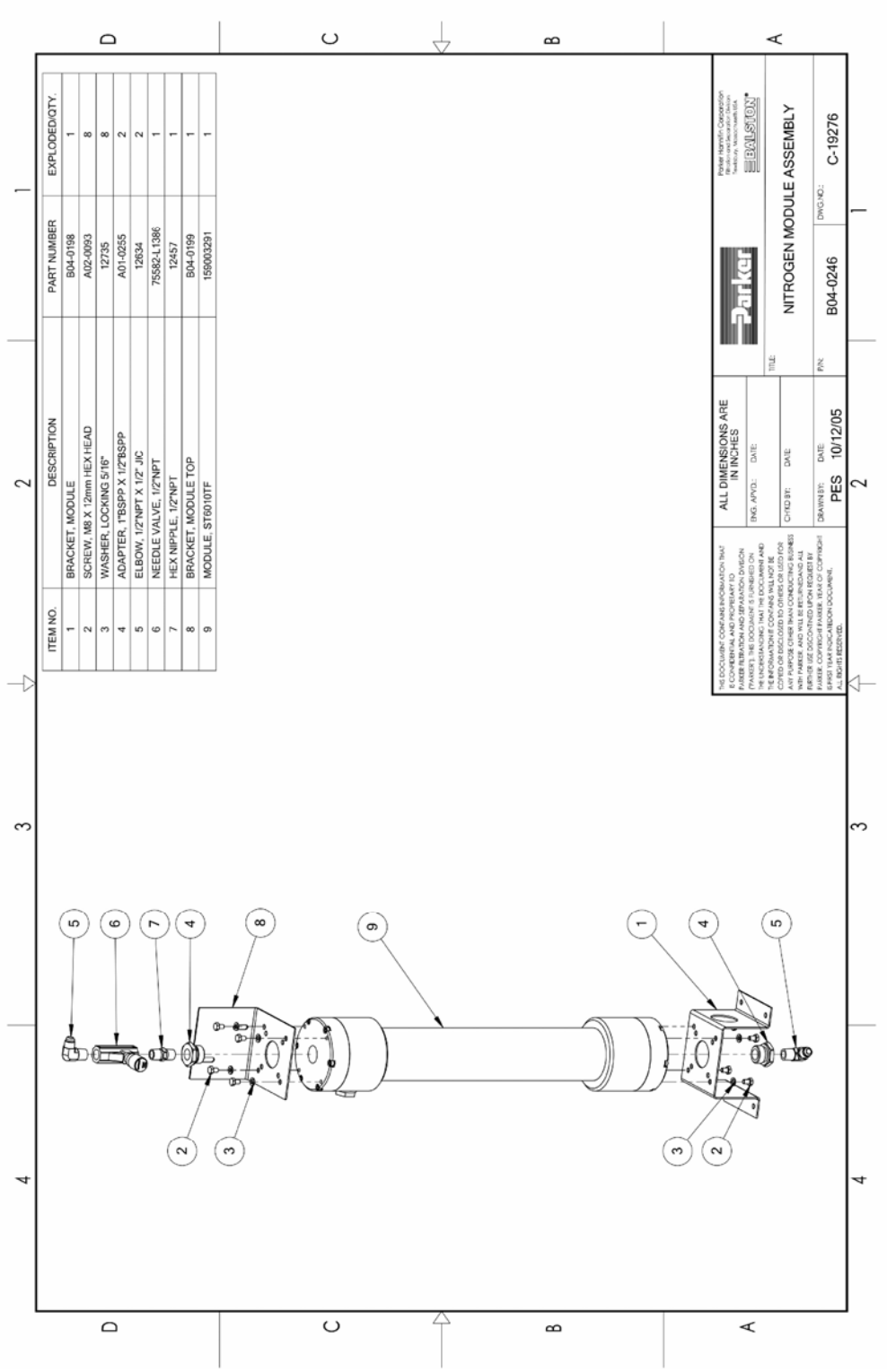
TITLE: FILTRATION ASSEMBLY

P/N: B04-0211

DWG NO: C-19108

REV: A

Fig. 7-7: Exploded View, Filtration Assembly



ITEM NO.	DESCRIPTION	PART NUMBER	EXPLODED/QTY.
1	BRACKET, MODULE	B04-0198	1
2	SCREW, M8 X 12mm HEX HEAD	A02-0093	8
3	WASHER, LOCKING 5/16"	12735	8
4	ADAPTER, 1"BSPP X 1/2"BSPP	A01-0255	2
5	ELBOW, 1/2"NPT X 1/2" JIC	12634	2
6	NEEDLE VALVE, 1/2"NPT	75582-L1386	1
7	HEX NIPPLE, 1/2"NPT	12457	1
8	BRACKET, MODULE TOP	B04-0199	1
9	MODULE, ST6010TF	159003291	1

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CHKD BY: DATE:

DRAWN BY: DATE: PES 10/12/05

TITLE: NITROGEN MODULE ASSEMBLY

P/N: B04-0246

DWG NO.: C-19276

Fig. 7-8: Exploded View, Nitrogen Module Assembly, MTS06

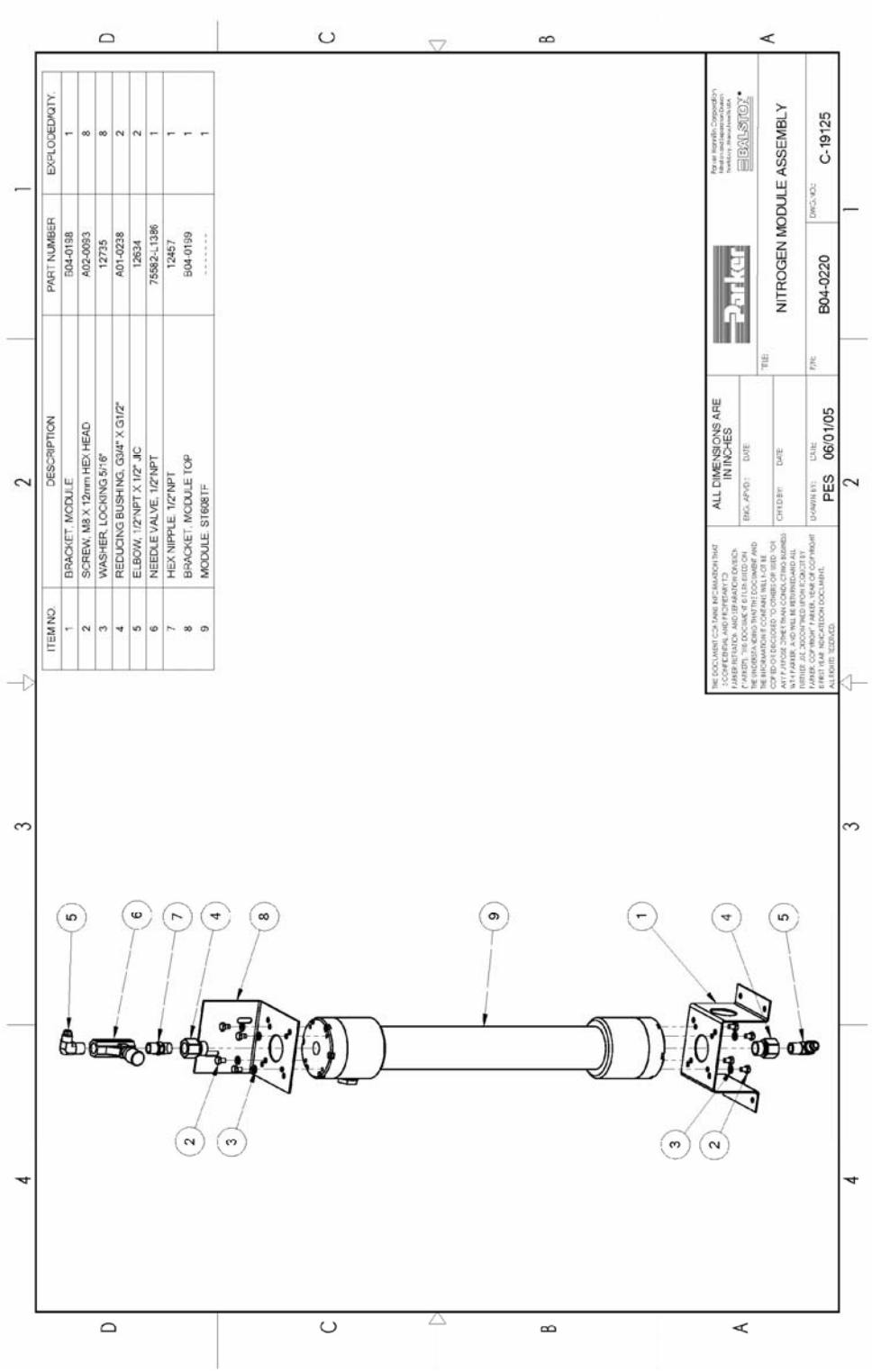
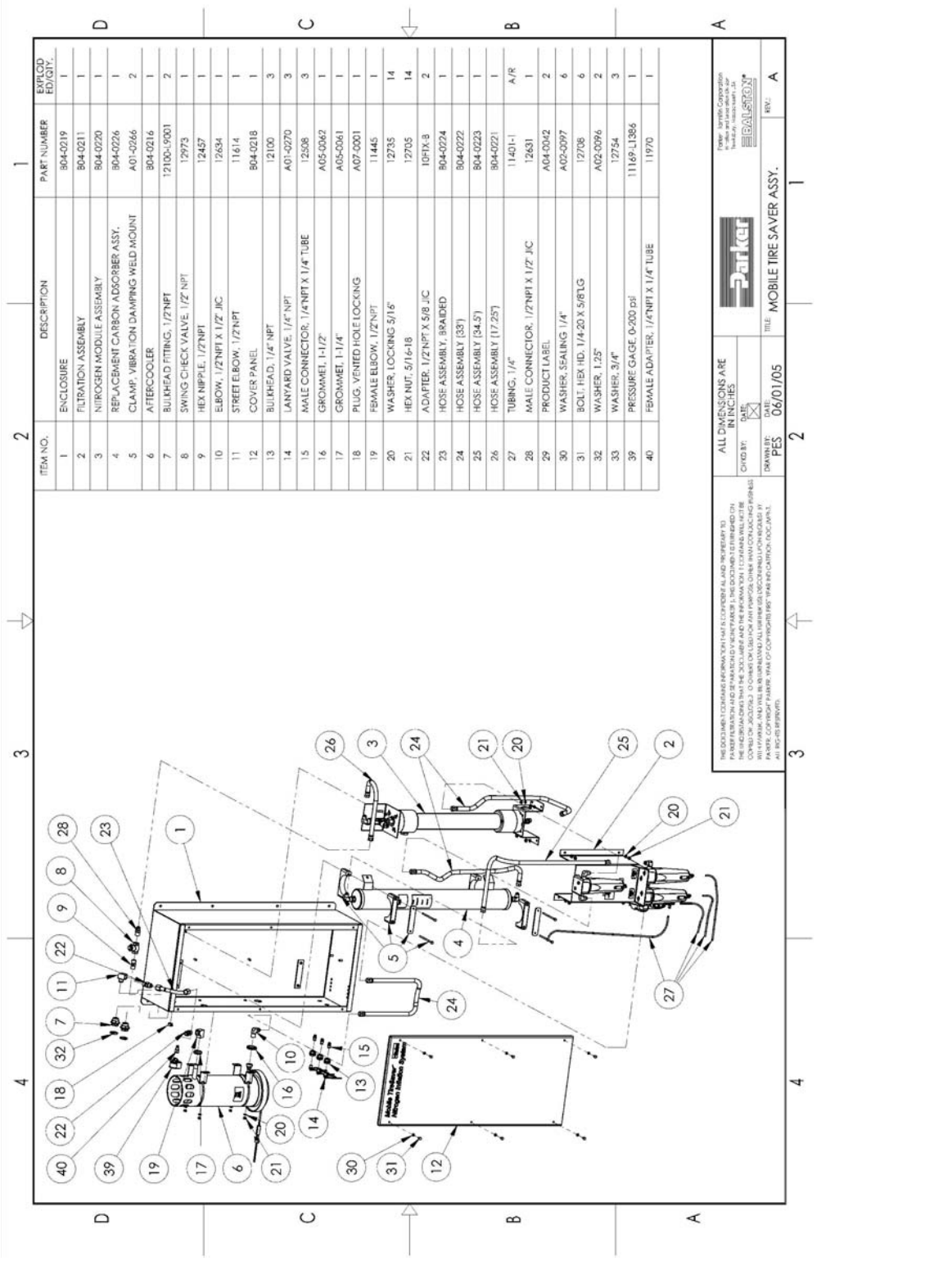

ITEM NO.
DESCRIPTION
PART NUMBER
EXPLODED QTY.
1 BRACKET, MODULE 504-0138 1
2 SCREW, M8 X 12mm HEX HEAD A02-0093 8
3 WASHER, LOCKING 5/16" 12735 8
4 REDUCING BUSHING, G3/4" X G1/2" A01-0238 2
5 ELBOW, 1/2"NPT X 1/2" JIC 12634 2
6 NEEDLE VALVE, 1/2"NPT 75582-L1386 1
7 HEX NIPPLE, 1/2"NPT 12457 1
8 BRACKET, MODULE TOP B04-0199 1
9 MODULE, S1608TF ------- 1
ALL DIMENSIONS ARE IN INCHES
NITROGEN MODULE ASSEMBLY
B04-0220
C-19125
PES 06/01/05

Fig. 7-9: Exploded View, Nitrogen Module Assembly, MTS12



ITEM NO.	DESCRIPTION	PART NUMBER	EXPLODED QTY.
1	ENCLOSURE	804-0219	1
2	FILTRATION ASSEMBLY	804-0211	1
3	NITROGEN MODULE ASSEMBLY	804-0220	1
4	REPLACEMENT CARBON ADSORBER ASSY.	804-0226	1
5	CLAMP, VIBRATION DAMPING WELD MOUNT	A01-0266	2
6	AFTERCOOLER	804-0216	1
7	BULKHEAD FITTING, 1/2"NPT	12100-9003	2
8	SWING CHECK VALVE, 1/2" NPT	12973	1
9	HEX NIPPLE, 1/2"NPT	12457	1
10	ELBOW, 1/2"NPT X 1/2" JIC	12634	1
11	STREET ELBOW, 1/2"NPT	11614	1
12	COVER PANEL	804-0218	1
13	BULKHEAD, 1/4" NPT	12100	3
14	LANYARD VALVE, 1/4" NPT	A01-0270	3
15	MALE CONNECTOR, 1/4"NPT X 1/4" TUBE	12508	3
16	GROMMET, 1-1/2"	A05-0062	1
17	GROMMET, 1-1/4"	A05-0061	1
18	PLUG, VENTED HOLE LOCKING	A07-0001	1
19	FEMALE ELBOW, 1/2"NPT	11445	1
20	WASHER, LOCKING 5/16"	12735	14
21	HEX NUT, 5/16-18	12705	14
22	ADAPTER, 1/2"NPT X 5/8 JIC	10-FIX-8	2
23	HOSE ASSEMBLY, BRAIDED	804-0224	1
24	HOSE ASSEMBLY (33")	804-0222	1
25	HOSE ASSEMBLY (34.5")	804-0223	1
26	HOSE ASSEMBLY (17.25")	804-0221	1
27	TUBING, 1/4"	11401-1	A/R
28	MALE CONNECTOR, 1/2"NPT X 1/2" JIC	12631	1
29	PRODUCT LABEL	A04-0042	2
30	WASHER, SEALING 1/4"	A02-0097	6
31	BOLT, HEX HD, 1/4-20 X 5/8"LG	12706	6
32	WASHER, 1.25"	A02-0096	2
33	WASHER, 3/4"	12754	3
39	PRESSURE GAGE, 0-200 psi	11169-L1386	1
40	FEMALE ADAPTER, 1/4"NPT X 1/4" TUBE	11970	1

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TITLE: MOBILE TIRE SAVER ASSY.

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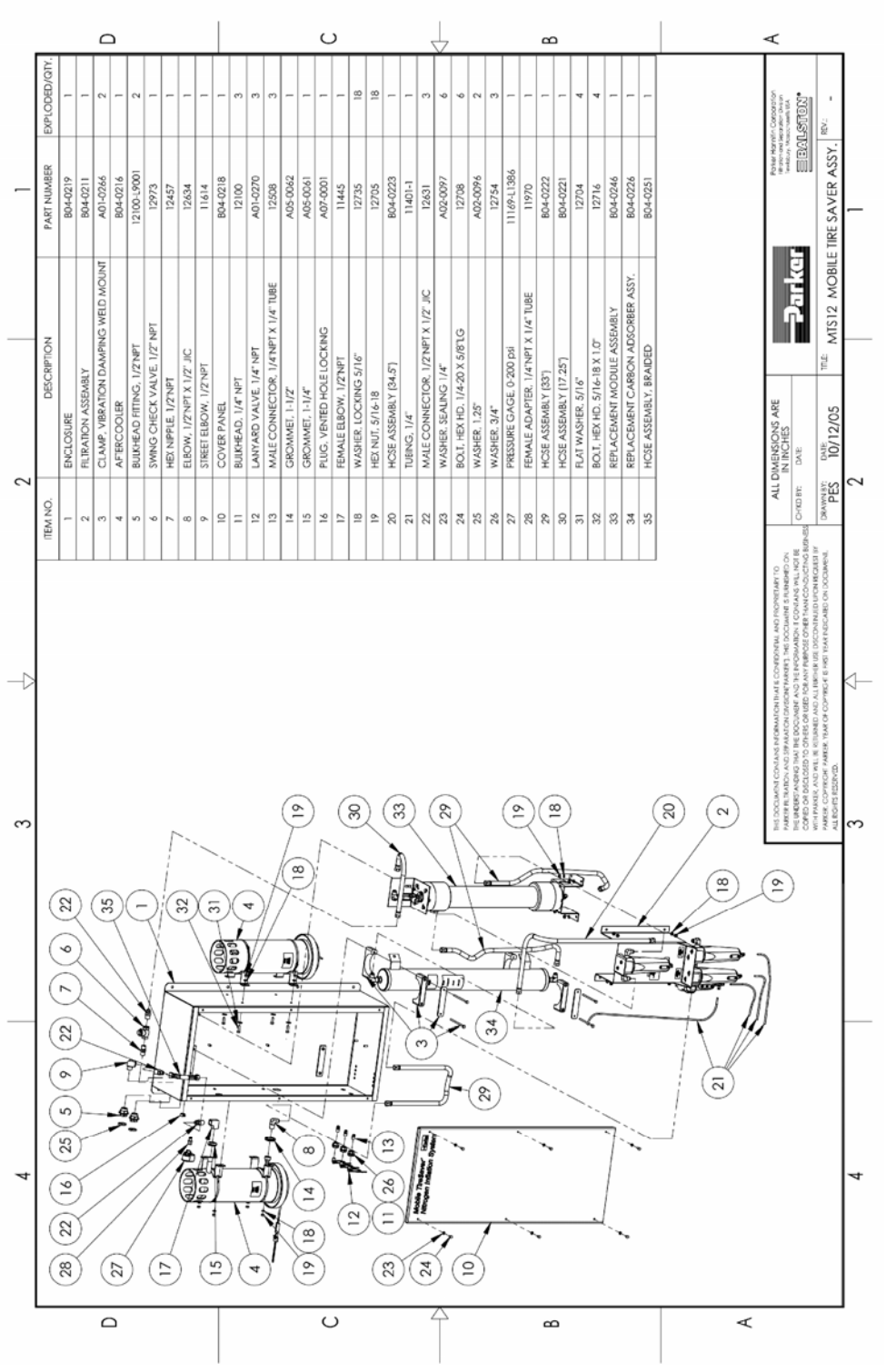
Fig. 7-10: Exploded View, Mobile TireSaver Assembly, MTS06


ITEM NO. | DESCRIPTION | PART NUMBER | EXPLODED/QTY.
1 | ENCLOSURE | B04-0219 | 1
2 | FILTRATION ASSEMBLY | B04-0211 | 1
3 | CLAMP, VIBRATION DAMPING WELD MOUNT | A01-0266 | 2
4 | AFTERCOOLER | B04-0216 | 1
5 | BULKHEAD FITTING, 1/2"NPT | 12100-9001 | 2
6 | SWING CHECK VALVE, 1/2" NPT | 12973 | 1
7 | HEX NIPPLE, 1/2"NPT | 12457 | 1
8 | ELBOW, 1/2"NPT X 1/2" JIC | 12634 | 1
9 | STREET ELBOW, 1/2"NPT | 11614 | 1
10 | COVER PANEL | B04-0218 | 1
11 | BULKHEAD, 1/4" NPT | 12100 | 3
12 | LANYARD VALVE, 1/4" NPT | A01-0270 | 3
13 | MALE CONNECTOR, 1/4"NPT X 1/4" TUBE | 12508 | 3
14 | GROMMET, 1-1/2" | A05-0062 | 1
15 | GROMMET, 1-1/4" | A05-0261 | 1
16 | PLUG, VENTED HOLE LOCKING | A07-0001 | 1
17 | FEMALE ELBOW, 1/2"NPT | 11445 | 1
18 | WASHER, LOCKING 5/16" | 12735 | 18
19 | HEX NUT, 5/16-18 | 12705 | 18
20 | HOSE ASSEMBLY (84.5") | B04-0223 | 1
21 | TUBING, 1/4" | 11401-1 | 1
22 | MALE CONNECTOR, 1/2"NPT X 1/2" JIC | 12631 | 3
23 | WASHER, SEALING 1/4" | A02-0097 | 6
24 | BOLT, HEX HD, 1/4-20 X 5/8"LG | 12708 | 6
25 | WASHER, 1.25" | A02-0096 | 2
26 | WASHER, 3/4" | 12754 | 3
27 | PRESSURE GAGE, 0-200 psi | 11169-L1386 | 3
28 | FEMALE ADAPTER, 1/4"NPT X 1/4" TUBE | 11970 | 1
29 | HOSE ASSEMBLY (33") | B04-0222 | 1
30 | HOSE ASSEMBLY (17.25") | B04-0221 | 1
31 | FLAT WASHER, 5/16" | 12704 | 4
32 | BOLT, HEX HD, 5/16-18 X 1.0" | 12716 | 4
33 | REPLACEMENT MODULE ASSEMBLY | B04-0246 | 1
34 | REPLACEMENT CARBON ADSORBER ASSY. | B04-0226 | 1
35 | HOSE ASSEMBLY, BRAIDED | B04-0251 | 1
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TITLE: MTS12 MOBILE TIRE SAVER ASSY.
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Fig. 7-11: Exploded View, Mobile TireSaver Assembly, MTS12

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Parker Hannifin Corporation
Filtration and Separation Division
242 Neck Road, P.O. Box 8223
Haverhill, MA 01835-0723
Tel: 978-858-0505 Fax: 978-858-0625

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Printed in U.S.A. TI-Bulletin MTS06B